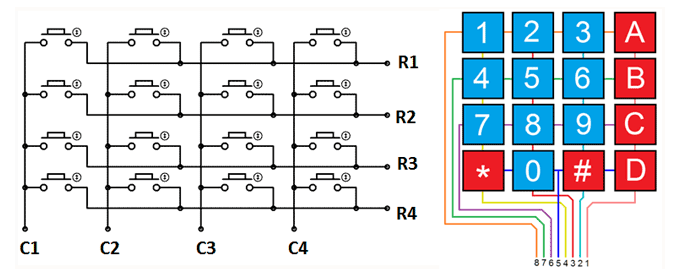
**Guide for Digital Lock**

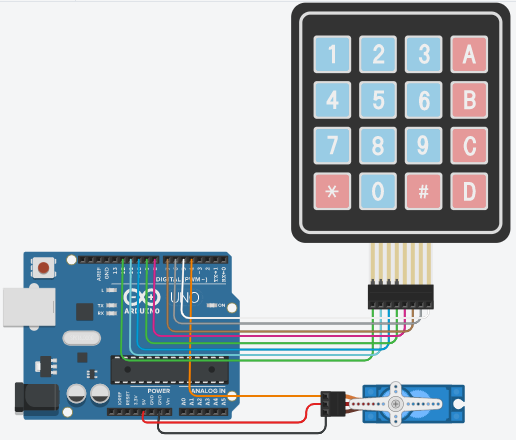
1. **Requirements**

* You have to create a digital lock with Arduino, keypad 4x4 and a servo motor (to move the latch for locking or unlocking)
* Your lock has a default password is 0000
* You lock can change password
* The # key will be used as function key
  + - Press # key less than 3s: call the unlock function
    - Press # key more than 3s: call the change password function

1. **Connected cuicuit**



|  |  |  |
| --- | --- | --- |
| Arduino I/O pin | Keypad | Keypad Pin |
| 12 | R1 | 8 |
| 11 | R2 | 7 |
| 10 | R3 | 6 |
| 9 | R4 | 5 |
| 8 | C1 | 4 |
| 7 | C2 | 3 |
| 6 | C3 | 2 |
| 5 | C4 | 1 |



1. **Coding the SKETCH**:

#include <Keypad.h>

#include <Servo.h>

#include <string.h>

/\*

Lib: https://github.com/Chris--A/Keypad/archive/master.zip

\*/

// Define some constants and variables

const byte rows = 4;

const byte columns = 4;

int holdDelay = 700;

int n =3;

int state = 0;

char key = 0;

int pos = 0;

//Default password is 0000

String default\_passwd = "0000";

//variable to store the user input for password

String input\_passwd = "";

//Define keys for lock and unlock or change password function

char lock\_key = '\*';

char unlock\_key = '#';

char change\_pass\_key = '-'; //press \* key for more than 3 second

// Create an instance for servo motor

Servo servo\_4;

//Define characters matrix

char keys[rows][columns] =

{

{'1', '2', '3', 'A'},

{'4', '5', '6', 'B'},

{'7', '8', '9', 'C'},

{'\*', '0', '#', 'D'},

};

//Define pins for every row of keypad

byte rowPins[rows] = {12, 11, 10, 9};

//Define pins for every column of keypad

byte columnPins[columns] = {8, 7, 6, 5};

// Create an instance for our keypad

Keypad keypad = Keypad(makeKeymap(keys), rowPins, columnPins, rows, columns);

// Define function for key

char function\_key(int n)

{

char temp = keypad.getKey();

if ((int)keypad.getState() == PRESSED)

{

if (temp != 0) {key = temp;}

}

if ((int)keypad.getState() == HOLD)

{

state++;

state = constrain(state, 1, n);

delay(holdDelay);

}

if ((int)keypad.getState() == RELEASED)

{

key += state;

state = 0;

}

delay(100);

Serial.println(key);

return key;

}

// Define function input\_password

String input\_password(int num\_char)

{

String passwd = "";

//Serial.print("Input password: ");

do

{

char temp = keypad.getKey();

if (temp != 0) {Serial.print(temp); passwd += temp;}

delay(100);

}

while (passwd.length() < num\_char);

Serial.println();

return passwd;

}

// Define function change\_password

String change\_password(int num\_char, String current\_passwd)

{

//Authenticate the old password:

Serial.print("Input old password: ");

String old\_passwd = input\_password(num\_char);

if (old\_passwd != current\_passwd)

{

Serial.println("Password does not match! Nothing changes");

return current\_passwd;

}

//New password

Serial.print("Input new password: ");

String new\_passwd = input\_password(num\_char);

//Confirm passwd

Serial.print("Input new password again: ");

String confirm\_passwd = input\_password(num\_char);

if (confirm\_passwd == new\_passwd)

{

Serial.println("Password has changed!!!");

return confirm\_passwd;

}

else

{

Serial.println("Password does not match! Nothing changes");

return current\_passwd;

}

}

void setup()

{

//Setting serial with baudrate 9600

Serial.begin(9600);

// connect signal pin of servo to pin number 4 on Uno

servo\_4.attach(4);

servo\_4.write(pos);

}

void unlock()

{

Serial.print("Input password: ");

input\_passwd = input\_password(4);

if (input\_passwd == default\_passwd)

{

//Unlock by servo\_4

for (pos = 0; pos <= 180; pos += 1)

{

// tell servo to go to position in variable 'pos'

servo\_4.write(pos);

// wait 15 ms for servo to reach the position

delay(15); // Wait for 15 millisecond(s)

}

delay(3000); //open door 3s then close

//lock by servo\_4

for (pos = 180; pos >= 0; pos -= 1)

{

// tell servo to go to position in variable 'pos'

servo\_4.write(pos);

// wait 15 ms for servo to reach the position

delay(15); // Wait for 15 millisecond(s)

}

}

else

{

Serial.println("Wrong password!");

}

}

void loop()

{

key = function\_key(n);

if (key == unlock\_key)

{

unlock()

//Reset input\_passwd

input\_passwd = "";

key = 0;

}

if (key == change\_pass\_key)

{

default\_passwd = change\_password(4, default\_passwd);

delay(2000);

key =0;

}

}